

TSMC-00-424

All Claims are believed to be in condition for Allowance, and that is so requested.

Reconsideration of Claims 1-20 rejected under 35 U.S.C. 112, second paragraph, is requested based on Amended Claims 1, 8, and 14, and the following remarks.

Claims 1, 8, and 14 have been amended to remove the indefinite reference regarding the n-well region being "not otherwise connected." This limitation had been added by amendment in the previous Amendment to the Application received at the USPTO May 7, 2002. The removal of the indefinite language returns Amended Claims 1, 8, and 14, to definitive language that should not be rejected under 35 U.S.C. 112, second paragraph.

Reconsideration of Claims 1-20 rejected under 35 U.S.C. 112, second paragraph, is requested based on Amended Claims 1, 8, and 14, and the above remarks.

Reconsideration of Claims 1-20 rejected under 35 U.S.C. 103(a) as unpatentable over Voogel et al (U.S. Patent 5,959,821) or Yu (U.S. Patent 5,742,085) in view of Amerasekera (U.S.

TSMC-00-424

Patent 5,949,094) is requested based on the Amended Claims 1, 8, and 14, and the following remarks.

Applicant agrees with the Examiner that Voogel et al, Yu, and Amerasekera teach ESD protection devices. However, Applicant notes a key difference between Applicant's ESD protection device and that taught by the cited art. The cited art teaches coupling the second voltage supply to both the P+ region in the N-Well AND to the N-well itself. Referring to Fig. 3 in Voogel, the second supply 165 is coupled to both the N+ 322 and the P+ 324 in the N-well 320. Referring to Fig. 4 of Yu, The second supply 1 is coupled to both the N+ 501 and to the P+ 502 in the N-well 50. Consequently, the N-well regions of these devices is tied directly to the second voltage supply through the N+ regions. By comparison, Applicant only couples the P+ region 152 in the N-well 156 to the second supply (VCC2) as shown Fig. 5. The N-well 156 is not tied to the second supply. Rather, the N-well 156 is left floating. This distinction is made clear by the device model in Fig. 7 where the N-well 312 is always at least a diode away from either of the supplies 324 and 328 or ground 320.

Further, the combination of either Voogel or Yu with Amerasekera does not alter the above analysis. Amerasekera teaches (Fig. 1b) coupling the N-well 3 to the second supply V_{NW} while including a p-region 5 coupled to another supply. By comparison, Applicant does not couple the N-well to another supply. The N-well is left floating.

To further clarify these differences, while not creating an indefinite limitation, Applicant has amended Claims 1, 8, and 14. Amended Claims 1, 8, and 14 now contain the closed form limitation "consisting of" in the prolog to the claims. Further, the indefinite language of the previous amendment has been removed. The amended language limits Applicant's device to a floating N-well where the P+ region in the N-well is coupled to the supply voltage. However, the N-well is not coupled to the supply through a like-type region (N+). The closed form, Amended Claims 1, 8, and 14, eliminate the devices taught by the cited art as outside the scope of these Claims. The above amendments are consistent with the original application (Fig. 5 and Specification pages 11-13) and do not represent new matters.

Applicant believes that Amended Claims 1, 8, and 14 clearly distinguish Applicant's device from the devices of the cited

TSMC-00-424

art. Applicant therefore believes that Amended Claims 1, 8, and 14 are in condition for allowance. Further, dependent Claims 2-7, 9-13, and 15-20 represent patentably distinct further limitations on Amended Claims 1, 8, and 14 and, therefore, should be in condition for allowance.

Reconsideration of Claims 1-20 rejected under 35 U.S.C. 103(a) as unpatentable over Voogel et al (U.S. Patent 5,959,821) or Yu (U.S. Patent 5,742,085) in view of Amerasekera (U.S. Patent 5,949,094) is requested based on the Amended Claims 1, 8, and 14, and the above remarks.

Applicants have reviewed the prior art made of record and not relied upon and agree with the Examiner that while the references are of general interest, they do not apply to the detailed Claims of the present invention.

Allowance of all Claims is requested.

Attached hereto is a marked-up version of the changes made to the Claims by the current amendment. The attached pages are captioned "VERSION WITH MARKINGS TO SHOW CHANGES MADE."

TSMC-00-424

It is requested that should Examiner O. Nadav not find that the Claims are now Allowable that he call the undersigned at 989-894-4392 to overcome any problems preventing allowance.

Respectfully submitted,

A handwritten signature in cursive script, reading "Douglas R. Schnabel".

Douglas R. Schnabel, Reg. No. 47,927

VERSION WITH MARKINGS TO SHOW CHANGES MADE

In the Claims

Please amend Claim 1 as follows:

1. (Amended) An electrostatic discharge protection device
[comprising] consisting of:

a p-well region in a semiconductor substrate;

an n+ region in said p-well region wherein said n+
5 region is connected to a first voltage supply;

an n-well region in said p-well region wherein said n+
region is spaced from said n-well region a distance such
that a depletion region extends therebetween during normal
operation; and

10 a p+ region in said n-well region wherein said p+
region is connected to a second voltage supply of greater
value than said first voltage supply during said normal
operation wherein current is conducted through said n+
region to said p+ region during an electrostatic discharge
15 event. [, wherein said n-well region is not otherwise
connected, and wherein no MOS gate is formed within said
device.]

Please amend Claim 8 as follows:

8. (Amended) An electrostatic discharge protection device
[comprising] consisting of:

a p-well region in a semiconductor substrate;

an n+ region in said p-well region wherein said n+
5 region is connected to a first voltage supply;

an n-well region in said p-well region wherein said n+
region is spaced from said n-well region a distance such
that a depletion region extends therebetween during normal
operation and wherein said distance between said n+ region
10 and said n-well region is between about 0.2 microns and 1.0
microns; and

a p+ region in said n-well region wherein said p+
region is connected to a second voltage supply of greater
value than said first voltage supply during said normal
15 operation wherein current is conducted through said n+
region to said p+ region during an electrostatic discharge
event. [, wherein said n-well region is not otherwise
connected, and wherein no MOS gate is formed within said
device.]

Please amend Claim 14 as follows:

14. (Amended) An electrostatic discharge protection circuit on an integrated circuit device, said protection circuit consisting of: [comprising:]

a ground pad connected to an external ground reference and to a p+ region in a p-well in a substrate;

5 a first voltage supply pad connected to an external first voltage supply and to an n+ region in said p-well; and

a second voltage supply pad connected to an external second voltage supply of greater value than said external first voltage supply during normal operation and to a p+ region in an n-well region in said p-well region wherein said n+ region is spaced from said n-well region a distance such that a depletion region extends therebetween during said normal operation, and wherein current is conducted
10 through said external second voltage supply pad to said external first voltage supply pad during an electrostatic discharge event. [, wherein said n-well region is not otherwise connected, and wherein no MOS gate is formed within said device.]
15